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Diseases, Insects, Pests

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Blackleg and Other Clostridial Diseases

Clostridial diseases inflict heavy losses among livestock in Alberta every year. The family of bacteria, Clostridia, are responsible for these diseases. They generally cause a fatal infection when they enter the animal's body. The bacteria are capable of living for years in the soil because of their ability to form spores, which protect them from the action of the weather. The following diseases are discussed in this factsheet:

- Blackleg
- Malignant edema
- Enterotoxemias
- Black disease
- Red water disease
- Tetanus (Lock jaw)

Blackleg

Blackleg is a disease of cattle, and less frequently of sheep, caused by the soil-borne bacterium, *Clostridium chauvei*. The disease develops rapidly in affected animals and often deaths occur before the owner has noticed any sickness in the herd.

Distribution

Blackleg occurs on all continents, although there are some local areas in various countries which are not affected. Most parts of Alberta are affected, but new outbreaks are found almost yearly in areas where the disease has not previously been reported. For this reason, livestock owners should not assume they will not have blackleg losses simply because they never have before. Because the causative bacteria are soil-borne, the disease may be introduced to new areas in several ways, including windstorms, water-ways and wild animals.

Signs

Blackleg commonly occurs in the warmer months of the year in young animals on pasture. Calves and yearlings are most often affected. Often no symptoms are observed; the animals are found dead on the pasture with no previous signs of illness. At other times, one or more of the young calves show signs of illness by a high fever, lack of appetite, depression, lameness, and swellings that appear in the muscles on various parts of the body. Sometimes the leg muscles are involved, or the muscles in the region of the back, hip, flank, chest or shoulder. In the latter stage of the disease, these swellings spread and become quite mushy, producing a characteristic crackling sound when pressed with the hand. This sound is due to the gas under the skin which is produced by the growing bacteria.

Postmortem changes

Putrefaction occurs rapidly in the carcass of an animal infected with blackleg and results in a typical bloated appearance of the carcass soon after death. The legs are extended stiffly and a frothy, bloody discharge is often apparent at the anus and the nostrils. The skin over the swelling is usually normal but in the centre it may have undergone dry gangrene. When cut open and examined, the swellings are usually found to contain discolored serum and gas. When affected muscles are cut open, they are usually found swollen and either black or darker in color than normal, with gas present. It is unwise to cut open a swelling unless necessary for a diagnosis, as this increases the contamination of the soil.

Diagnosis

Livestock owners should familiarize themselves with the signs of this dangerous and costly disease, so that cases are not ignored or passed off as bloat. A veterinarian should be called to make an accurate diagnosis as soon as possible. A wrong diagnosis, or no diagnosis, could be serious and expensive because more animals may become infected and result in heavy losses in the herd. It is often difficult to make an exact diagnosis in the field because of the similarity of the signs of blackleg to certain other diseases. Lead, mercury and arsenic poisoning and bloat, as well as some of the plant poisons, can be confused with blackleg. Although certain features of the disease are characteristic, a positive diagnosis requires laboratory confirmation.

Copies of this and related publications may be obtained from the Print Media Branch, Alberta Agriculture, 7000 - 113 Street, Edmonton, Alberta T6H 5T6 or Alberta Agriculture's District Offices.

Specimens may be submitted, preferably through your local veterinary practitioner to the Provincial Veterinary Laboratories of Alberta Agriculture, at Edmonton, Fairview, Lethbridge or Airdrie. A portion of the affected muscle tissue can be placed in a clean glass jar or plastic bag and packed so that it will not break or leak, and sent, packed in ice, to the laboratory as soon as possible after the death of the animal.

Treatment

If cases are noted in the early stages of infection, they may respond to immediate treatment with penicillin or other antibiotics in large doses. It is essential, of course, that an accurate diagnosis be made in order that the correct treatment is given. In recovered cases, the animal may be stiff in the leg, shoulder, etc., due to shrinking or thickening of the muscles.

Control and prevention

Because it is practically impossible to prevent animals from coming into contact with the disease, the chief control method for blackleg lies in building up resistance in the animals by use of a bacterin or vaccine. The recommended procedure for vaccination is to inoculate all young cattle between one and three months of age with a bacterin. Because blackleg and malignant edema are so similar and often may both be present in an outbreak, it is recommended that the so-called mixed bacterin be used. This contains the killed bacteria of both diseases, (*Clostridium chauvei* and *Clostridium septicum*). A second injection of the bacterin should be given when an animal reaches six months of age. To be on the safe side, and to ensure as permanent immunity as possible where the disease has occurred before, all the cattle should be revaccinated annualiy until they reach three years of age. Routine vaccination procedures will vary with the type of livestock operation involved.

In case of an outbreak of blackleg in a herd, it is advisable to vaccinate or revaccinate, as the case may be, all of the animals with a recommended dose of the bacterin. As with other vaccines, there is a period of about two weeks following vaccination in which the animals have not built up a strong resistance to the disease. Losses may continue during this period, so it may be advisable to move the herd to another pasture after losses from blackleg occur and vaccination is carried out.

The bacterins used for vaccination against blackleg and malignant edema are perishable products and deteriorate rapidly if they are not stored properly. The manufacturer's directions regarding storage and handling should be rigidly followed in order to assure that the vaccine is at it's highest potency. After the vaccination has been completed, any partially used vaccine containers should be discarded and not retained for later use.

Sanitation

The bacteria that cause blackleg are capable of living in the soil. They have the capacity to form spores which can protect the organism from the effects of weather, and hence soil can remain infected for many years. Carcasses of animals affected by the disease are the chief source of soil infection. They harbor the germs in large numbers and liberate them from both artificial and natural body openings into the surrounding soil. For this reason, every dead animal should be promptly burned or buried. The surface of the ground may be treated by burning it over with a heavy layer of straw, used oil, etc.

Malignant edema

This disease, commonly called stable blackleg, is very similar to blackleg. In fact, the similarity is so close that often a diagnosis can be made only when the specific bacteria are identified in the laboratory. Furthermore, both organisms may be present in the same outbreak, or even in the same animal. Malignant edema does differ from blackleg in some respects. It is caused by a bacterium called *Clostridium septicum*. It is more common in older animals, and also is more likely to occur during the winter months than blackleg.

The preceding information on blackleg also applies to malignant edema, and for practical purposes, symptoms, treatment and control are the same.

Blackleg and malignant edema of sheep

These two diseases are indistinguishable in sheep, except by laboratory examination. However, the conditions are not commonly seen in Alberta. The infection occurs in sheep after contamination of wounds by soil-borne spores. This method of infection by blackleg or malignant edema may cause losses from navel infection in newborn lambs, in rams after fighting, and from contamination of wounds inflicted during shearing, dipping, lambing, castrating, or docking. The diseases may occur in sheep of any age. The control, treatment and prevention of these diseases are the same as for these infections in cattle. Particular attention should be given to cleansing and disinfection of instruments, hands, etc., when operating on sheep. In areas where this disease is known to exist, lambs should be vaccinated at one month of age with one-half the dose recommended for cattle. A booster injection should be given at three months of age.

Enterotoxemias

The clostridial enterotoxemias can occur in all farm animal species. *Clostridium perfringens* is a normal inhabitant of the intestinal tract. Under certain conditions the organisms multiply rapidly, producing harmful levels of toxin. Rapidly growing, well fed animals are most susceptible to the disease

Clostridium perfringens Type C has been incriminated as the cause of acute bloody enteritis in young calves and lambs. Affected animals are usually under three weeks of age and usually found dead. A postmortem is required to confirm the diagnosis. The disease is prevented by vaccinating dams in late pregnancy with a Type C toxoid.

Enterotoxemia due to *Clostridium perfringens* Type D (pulpy kidney disease, overeating disease) is by far the most common form of enterotoxemia in sheep and goats. While most common in lambs, it also occurs in adult sheep, goats and calves. Lambs in the best nutritional condition are usually affected at two approximate ages - in nursing lambs when they are two to twelve weeks of age; or later, at four to six months, soon after entering feedlots. The death loss among affected lambs may be 100 per cent.

Sudden deaths in a group of lambs at these two age levels should be viewed with suspicion, and diagnosis entrusted to a qualified veterinarian. Effective prevention in young animals requires annual vaccination of ewes in late pregnancy using a vaccine containing Type D toxoid. An early diagnosis and effective vaccination program can help considerably to reduce losses in a flock.

In feeder lambs, reduction in the amount of the grain ration for a few days also helps to reduce losses. Experience in several flocks in Alberta has shown that routine vaccination of lambs with *Clostridium perfringens* Type D bacterin results in thriftier and more efficient lambs. However, the main methods of preventing this disease in feeder lambs is to stop them from overeating when first placed in the feed lot. A small amount of grain should be fed at first, and the grain ration gradually increased as the lambs become accustomed to it.

Black disease

This is a disease of sheep found mainly in the areas that are affected with the parasite known as the liver fluke, which, fortunately, is quite rare in Alberta. The infection is caused by the bacterium *Clostridium novyi*, which becomes active in the liver tissue damaged by the liver fluke and then produces the disease.

Feeder lambs from the drier pasture areas may suffer severe death losses within three weeks to a month after being placed on fluke-infected pastures or having access to irrigation ditches and swampy spots. Death occurs suddenly.

Since postmortem lesions of this condition can be easily confused with a number of other diseases, a veterinarian should be called for an accurate diagnosis. Control relies on vaccines and the reduction or elimination of the liver fluke from infected areas.

Red water disease

This is a condition of cattle caused by the bacterium *Clostridium haemolyticum*. The disease was so named because of the red color of the urine, which is one of the striking symptoms seen in infected animals. Animals affected with this condition rapidly become sick, with a high fever and depression; death occurs in 24 to 36 hours. A veterinarian should be consulted for an accurate diagnosis of the disease. The term "red water" is confusing, because reddening of the urine occurs in several other cattle diseases. The liver undergoes characteristic changes with this disease, hence the entire organ, if possible, should be submitted to the laboratory to confirm the condition. Veterinarians have an antiserum available, which is fairly effective in the early stages of this disease. Vaccines may be used as a preventive measure in areas where the infection is known to exist.

Tetanus

This disease, commonly called Lock Jaw, results from the infection of a wound with the soil-borne bacterium *Clostridium tetani*. Among domestic animals, the horse is the most susceptible. While the disease is rare in Alberta, it is a serious problem in some parts of Canada.

Signs

Tetanus is characterized by a very high fever and the development of rigid, tense muscles. An infected horse will be unable to open it's mouth. In the latter stages, the animal goes down and the muscles over the entire body become hard and contracted. Treatment of infected animals includes early cleansing and disinfection of wounds and the use of antitoxins.

Vaccinations

There are a variety of clostridial organisms that can cause illness and death in farm animals. Though some diseases are uncommon, they can occur, and for this reason alone, the routine use of combined clostridial vaccines is recommended. Clostridial vaccines are very effective, especially when administered at frequent intervals. Current multiple vaccines are capable of immunizing against seven or eight separate clostridial diseases.

Carcass blemishes may result from intramuscular injection of certain products, even when administered to young animals months before slaughter. Clostridial vaccines should be administered subcutaneously in the neck region. "Tent" the skin and use a needle no longer than 2.5 cm to administer the vaccine.

Currently, there are no commercial clostridial vaccines licenced for use in goats in Canada. Goat producers have used vaccines approved for use in sheep. This is an extra-label use and done at the risk of the producer.

Remember – to control blackleg and its allies –

- Have all losses autopsied by your veterinarian.
- Vaccinate all calves routinely at one to three months, six months, and again at one year of age.
- Refrigerate the bacterin at all times until used.
- Once blackleg or malignant edema has occurred, the premises will remain infected for many years.
- Burn or bury all animal carcasses.
- If blackleg or malignant edema strike, revaccinate all cattle under three years of age.

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